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Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3) Departament Badań Układów Złożonych (DUZ)

Wtorek: **12.05.2020**
11:30

Mateusz Nowak

Analytical design of the direct current magnetohydrodynamic pump

Abstract:

In the Dual Fluid Reactor (DFR) plants, there are two separated loops in which liquid metals, Uranium-Chromium eutectic as fuel and lead as a coolant will flow. Due to the high operating temperature of DFR, special contact-free pumps have to be applied. The best solution seems to be a magnetohydrodynamic pumping system which can utilize magnetic and electric fields acting on the metallic flow.

Among various types of magnetohydrodynamic pumps, we have chosen the DC conduction pump which is characterized by a compact, simple design and a continuous operating mode. This pump will also be particularly well suited to the construction of the DFR minidemonstrator, whose construction is planned as the first stage of DFR research and development.

To calculate the parameters of a DC magnetohydrodynamic pump, an analytical method in analogy to the equivalent of an electric circuit has been implanted. This method allows to simplify the electromagnetic field equations and convert them into an electrical circuit problem. The presentation will launch the method in more detail.

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